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Report on the individual review of the annual submission of Lithuania submitted in 2014*

* In the symbol for this document, 2014 refers to the year in which the inventory was submitted, and not to the year of publication.

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I. Introduction and summary

1. This report covers the review of the 2014 annual submission of Lithuania, coordinated by the UNFCCC secretariat, in accordance with the "Guidelines for review under Article 8 of the Kyoto Protocol" (decision 22/CMP.1) (hereinafter referred to as the Article 8 review guidelines). The review took place from 22 to 27 September 2014 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalist – Ms. Anna Romanovskaya (Russian Federation) and Mr. John Watterson (United Kingdom of Great Britain and Northern Ireland); energy – Mr. Christo Christov (Bulgaria), Ms. Olia Glade (New Zealand), Mr. Audace Ndayizeye (Burundi) and Mr. Daniel Tutu Benefoh (Ghana); industrial processes and solvent and other product use – Ms. Maria Jose Lopez (Belgium) and Mr. Kiyoto Tanabe (Japan); agriculture – Mr. Asaye Ketema Sekie (Ethiopia) and Ms. Penelope Reyenga (Australia) and; land use, land-use change and forestry (LULUCF) – Mr. Manuel Estrada (Mexico), Mr. Walter Oyhantcabal (Uruguay) and Ms. Valentyna Slivinska (Ukraine); and waste – Mr. Chart Chiemchaisri (Thailand) and Mr. Gustavo Barbosa Mozzer (Brazil). Mr. Tanabe and Mr. Tutu Benefoh were the lead reviewers. The review was coordinated by Ms. Suvi Monni (UNFCCC secretariat).

2. In accordance with the Article 8 review guidelines, a draft version of this report was sent to the Government of Lithuania, which provided comments that were considered and incorporated, as appropriate, into this final version of the report. All encouragements and recommendations in this report are for the next annual submission, unless otherwise specified. The expert review team (ERT) notes that the 2013 annual review report of Lithuania was published after 15 April 2014, which may have affected the Party's ability to implement recommendations and encouragements made in the previous review report.

3. All recommendations and encouragements included in this report are based on the ERT's assessment of the 2014 annual submission against the Article 8 review guidelines. The ERT has not taken into account the fact that Parties will prepare the submissions due by 15 April 2015 using the revised guidelines, namely the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories" (hereinafter referred to as the UNFCCC Annex I inventory reporting guidelines) adopted through decision 24/CP.19. Therefore, when preparing the 2015 annual submissions, Parties should evaluate the implementation of the recommendations and encouragements in this report, in the context of those guidelines.

4. In 2012, the main greenhouse gas (GHG) emitted by Lithuania was carbon dioxide (CO_2), accounting for 65.6 per cent of total GHG emissions[1] expressed in CO_2 equivalent (CO_2 eq), followed by nitrous oxide (N_2O) (19.2 per cent) and methane (CH_4) (14.1 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) collectively accounted for 1.1 per cent of the overall GHG emissions in the country. The energy sector accounted for 55.0 per cent of total GHG emissions, followed by the agriculture sector (23.4 per cent), the industrial processes sector (16.8 per cent), the waste sector (4.5 per cent) and the solvent and other product use sector (0.4 per cent). Total GHG emissions amounted to 21,622.76 Gg CO_2 eq and decreased by 55.6 per cent between the

[1] In this report, the term "total GHG emissions" refers to the aggregated national GHG emissions expressed in terms of CO_2 eq excluding LULUCF, unless otherwise specified.

base year[2] and 2012. The ERT concluded that the description in the national inventory report (NIR) of the trends for the different gases and sectors is reasonable.

5. Tables 1 and 2 show GHG emissions from sources included in Annex A to the Kyoto Protocol (hereinafter referred to as Annex A sources), emissions and removals from the LULUCF sector under the Convention and emissions and removals from activities under Article 3, paragraph 3, and, if any, elected activities under Article 3, paragraph 4, of the Kyoto Protocol (KP-LULUCF), by gas and by sector and activity, respectively.

6. Information to be included in the compilation and accounting database can be found in annex I to this report.

[2] "Base year" refers to the base year under the Kyoto Protocol, which is 1990 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. The base year emissions include emissions from sources included in Annex A to the Kyoto Protocol only.

Table 1

Greenhouse gas emissions from Annex A sources and emissions/removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol by gas, base year[a] to 2012

		Gg CO_2 eq								*Change (%)*
	Greenhouse gas	*Base year*	*1990*	*1995*	*2008*	*2009*	*2010*	*2011*	*2012*	*Base year–2012*
Annex A sources	CO_2	35 785.54	35 785.54	15 062.65	15 079.27	12 893.58	13 692.17	14 029.54	14 182.47	–60.4
	CH_4	5 749.55	5 749.55	3 625.72	3 359.56	3 259.25	3 207.96	3 071.44	3 051.32	–46.9
	N_2O	7 186.23	7 186.23	3 381.48	6 337.55	4 108.58	4 020.43	4 351.73	4 144.12	–42.3
	HFCs	2.76	NA, NO	2.76	152.81	167.76	192.48	219.51	240.66	8 629.2
	PFCs	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA
	SF_6	0.05	NA, NO	0.05	3.21	2.77	5.85	8.12	4.19	8 655.4
KP-LULUCF Article 3.3[b]	CO_2				–86.22	–117.82	–100.42	–148.36	–129.87	
	CH_4				0.01	0.01	0.01	0.01	0.004	
	N_2O				0.001	0.002	0.001	0.002	0.001	
KP-LULUCF Article 3.4[c]	CO_2	NA			–9 056.21	–11 681.62	–10 634.33	–10 888.97	–9 234.98	NA
	CH_4	NA			0.37	1.05	0.06	0.97	0.06	NA
	N_2O	NA			23.08	23.25	23.12	23.37	23.31	NA

Abbreviations: Annex A sources = source categories included in Annex A to the Kyoto Protocol, KP-LULUCF = land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, NA = not applicable, NO = not occurring.

[a] The base year for Annex A sources refers to the base year under the Kyoto Protocol, which is 1990 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. For activities under Article 3, paragraph 3, of the Kyoto Protocol and forest management under Article 3, paragraph 4, only the inventory years of the commitment period must be reported.

[b] Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation.

[c] Elected activities under Article 3, paragraph 4, of the Kyoto Protocol, including forest management, cropland management, grazing land management and revegetation.

Table 2
Greenhouse gas emissions by sector and activity, base year[a] to 2012

			Gg CO_2 eq							Change (%)
		Sector	Base year	1990	1995	2008	2009	2010	2011	2012	Base year–2012
Annex A sources		Energy	32 653.20	32 653.20	13 886.01	13 069.43	11 833.19	12 722.32	11 877.96	11 885.26	–63.6
		Industrial processes	4 461.07	4 458.26	2 138.00	5 562.41	2 368.13	2 230.63	3 738.72	3 627.40	–18.7
		Solvent and other product use	197.52	197.52	186.36	91.19	95.55	87.48	85.89	83.74	–57.6
		Agriculture	10 289.83	10 289.83	4 683.41	5 093.73	5 042.59	5 014.25	4 986.85	5 059.98	–50.8
		Waste	1 122.51	1 122.51	1 178.88	1 115.65	1 092.47	1 064.22	990.91	966.38	–13.9
		LULUCF	NA	–4 293.55	–3 512.45	–8 538.78	–10 668.85	–10 481.18	–10 574.63	–8 076.62	NA
		Total (with LULUCF)	**NA**	**44 427.77**	**18 560.21**	**16 393.63**	**9 763.08**	**10 637.71**	**11 105.71**	**13 546.13**	**NA**
		Total (without LULUCF)	**48 724.13**	**48 721.32**	**22 072.65**	**24 932.40**	**20 431.93**	**21 118.89**	**21 680.34**	**21 622.76**	**–55.6**
		Other[b]	NA	NA	NA	NA	NA	NA	NA	NA	NA
KP-LULUCF	Article 3.3[c]	Afforestation and reforestation				–115.58	–135.70	–146.39	–166.79	–195.86	
		Deforestation				29.37	17.89	45.98	18.44	65.99	
		Total (3.3)				**–86.21**	**–117.81**	**–100.41**	**–148.35**	**–129.87**	
	Article 3.4[d]	Forest management				–9 032.76	–11 657.33	–10 611.15	–10 864.63	–9 211.61	
		Cropland management	NA			NA	NA	NA	NA	NA	NA
		Grazing land management	NA			NA	NA	NA	NA	NA	NA
		Revegetation	NA			NA	NA	NA	NA	NA	NA
		Total (3.4)	**NA**			**–9 032.76**	**–11 657.33**	**–10 611.15**	**–10 864.63**	**–9 211.61**	**NA**

Abbreviations: Annex A sources = source categories included in Annex A to the Kyoto Protocol, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LULUCF = land use, land-use change and forestry, NA = not applicable.

[a] The base year for Annex A sources is the base year under the Kyoto Protocol, which is 1990 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. For activities under Article 3, paragraph 3, of the Kyoto Protocol and forest management under Article 3, paragraph 4, only the inventory years of the commitment period must be reported.

[b] Emissions/removals reported in the sector other (sector 7) are not included in Annex A to the Kyoto Protocol and are therefore not included in national totals.

[c] Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation.

[d] Elected activities under Article 3, paragraph 4, of the Kyoto Protocol, including forest management, cropland management, grazing land management and revegetation.

II. Technical assessment of the annual submission

A. Overview

1. Annual submission and other sources of information

7. The 2014 annual submission was submitted on 15 April 2014; it contains a complete set of common reporting format (CRF) tables for the period 1990–2012 and an NIR. Lithuania also submitted the information required under Article 7, paragraph 1, of the Kyoto Protocol, including information on: activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, accounting of Kyoto Protocol units, changes in the national system and in the national registry and the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol. The standard electronic format (SEF) tables were submitted on 15 April 2014. The annual submission was submitted in accordance with decision 15/CMP.1.

8. Lithuania submitted revised emission estimates on 28 October 2014 in response to the list of potential problems and further questions from the ERT (see paras. 37–40 below). The values used in this report are those submitted by Lithuania on 28 October 2014.

9. The list of other materials used during the review is provided in annex II to this report.

2. Questions of implementation raised in the 2013 annual review report

10. The ERT noted that no questions of implementation have been raised in the 2013 annual review report.

3. Overall assessment of the inventory

11. Table 3 contains the ERT's overall assessment of the annual submission of Lithuania. For recommendations for improvements for specific categories, please see the paragraphs cross-referenced in the table.

Table 3
The expert review team's overall assessment of the annual submission

Issue	*Expert review team assessment*	*General findings and recommendations*
The ERT's findings on completeness		
Annex A sources[a]	Complete for 2001–2012, not complete for 1990–2000	Mandatory: the Party has not estimated CO_2, CH_4 and N_2O emissions from other (fuel combustion activities) – mobile – military use of jet kerosene (for 1990–2000) The ERT recommends that the Party estimate and report emissions from all mandatory categories
		Non-mandatory: the Party has not estimated CH_4 and N_2O emissions from glass production; CO_2 emissions from chemical products, manufacture and processing (solvent and other product use sector); N_2O emissions from degreasing and dry cleaning, fire extinguishers,

Issue	*Expert review team assessment*	*General findings and recommendations*
		aerosol cans and other uses of N_2O; CH_4 from agricultural soils; N_2O emissions from industrial wastewater and from domestic and commercial wastewater – wastewater; potential emissions of HFC-32, HFC-125, HFC-134a, HFC-143a and SF_6 for 1995–2012 (export in bulk, export in products and destroyed amounts)
Land use, land-use change and forestry[a]	Not complete	Mandatory: the Party has not estimated carbon stock changes in living biomass for cropland and grassland converted to wetlands (1991–2012) (para. 61)
		The ERT recommends that the Party estimate and report emissions from all mandatory categories
		Non-mandatory: the Party has not estimated carbon stock changes in dead organic matter for cropland and grassland converted to wetlands and settlements (1991–2012); CH_4 emissions from drainage of soils and wetlands – wetlands and from forest land – organic soils; N_2O emissions from drainage of soils and wetlands – wetlands – flooded lands; CO_2, CH_4 and N_2O emissions from biomass burning for wetlands remaining wetlands (wildfires), settlements and other land
		The ERT encourages the Party to estimate and report emissions from all non-mandatory categories
KP-LULUCF	Complete	
The ERT's findings on recalculations and time-series consistency		
Transparency of recalculations	Sufficiently transparent	
Time-series consistency	Sufficiently consistent	
The ERT's findings on QA/QC procedures	Sufficient	The Party has elaborated a QA/QC plan and has implemented tier 1 QA/QC procedures in accordance with that plan. The ERT finds that there are a number of inconsistencies between data reported in the CRF tables and the NIR, and recommends that the Party reinforce the implementation of appropriate tier 1 QC procedures
		The ERT reiterates the recommendation made in the previous review report that Lithuania explain how the "basic internal review" referred to in the

Issue	*Expert review team assessment*	*General findings and recommendations*
		NIR and further elaborated during the review is used to make improvements to the inventory, and also recommends that the Party explain that the institutes carrying out the review are not directly involved in inventory preparation, in order to justify the basic internal review as a QA activity rather than a QC activity. The ERT encourages Lithuania to include the time-series checks (i.e. those carried out after data input to the CRF Reporter software) in the QA/QC plan, and summarize the checks done in the NIR, in line with information provided during the review Please see paragraphs 20, 33 and 46 below for category-specific recommendations
The ERT's findings on transparency	Sufficiently transparent	Please see paragraphs 23–27, 32, 33, 42, 47–49, 51–53, 62, 69–72 below for category-specific recommendations

Abbreviations: Annex A sources = source categories included in Annex A to the Kyoto Protocol, CRF = common reporting format, ERT = expert review team, KP-LULUCF = land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, NIR = national inventory report, QA = quality assurance, QC = quality control.

[a] The assessment of completeness by the ERT considers only the completeness of reporting of mandatory categories (i.e. categories for which methods and default emission factors are provided in the Intergovernmental Panel on Climate Change (IPCC) *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*, the IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* or the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry*).

12. In its NIR, Lithuania does not report two of the annexes included in the 'structure of the national inventory report' presented in annex I to the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories" (hereinafter referred to as the UNFCCC reporting guidelines): annex 4 "CO_2 reference approach and comparison with sectoral approach, and relevant information on the national energy balance"; and annex 5 "Assessment of completeness and (potential) sources and sinks of greenhouse gas emissions and removals excluded". In response to a question raised by the ERT during the review, the Party indicated that: (i) information on the national energy balance is provided in annex 3 of its NIR and detailed information on a comparison of sectoral approach with the reference approach is provided in its NIR (section 3.2.1); and (ii) information on general completeness of the inventory is provided in the NIR (section 1.8) and in CRF table 9(a). Lithuania also indicated that it would be possible to provide these annexes in its NIR. The ERT encourages the Party to report these annexes to improve the transparency of its NIR.

4. Description of the institutional arrangements for inventory preparation, including the legal and procedural arrangements for inventory planning, preparation and management

Inventory planning

13. The NIR (sections 1.2–1.3) described the national system for the preparation of the inventory. As indicated by the Party in its NIR, there were no major changes to the inventory planning process. The description of the inventory planning process, as contained

in the report of the individual review of the annual submission of Lithuania submitted in 2013,[3] remains relevant. However, it is explained in the NIR that Governmental Resolution No. 683 and Ministry of Environment Order No. D1-538, which together establish the permanent GHG inventory working group, were amended on 18 December 2013 and 9 January 2014 by Governmental Resolution No. 1221 and Ministry of Environment Order No. D1-25, respectively, for example to reflect the names of the experts nominated to the working group.

Inventory preparation

14. Table 4 contains the ERT's assessment of Lithuania's inventory preparation process.

Table 4

Assessment of inventory preparation by Lithuania

Issue	*Expert review team assessment*	*ERT findings and recommendations*
Key category analysis		
Was the key category analysis performed in accordance with the IPCC good practice guidance and the IPCC good practice guidance for LULUCF?	Tier 1: yes Tier 2: no	Level and trend analysis performed, including and excluding LULUCF In the tier 2 analysis, Lithuania did not identify as key the first category exceeding the threshold of 90% for level (2012) and trend. The ERT recommends that the Party correct its key category analysis
Approach followed?	Both tier 1 and tier 2	
Were additional key categories identified using a qualitative approach?	No	In response to a question raised by the ERT during the review, the Party stated that qualitative analysis was not carried out as it would identify categories that had already been identified as key through quantitative analysis. The ERT notes that it is good practice to carry out the qualitative analysis, and encourages the Party to do so
Has the Party identified key categories for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol following the guidance on establishing the relationship between the activities under the Kyoto Protocol and the associated key categories in the UNFCCC inventory?	Yes	
Does the Party use the key category analysis to prioritize inventory improvements?	Yes	In response to a question raised by the ERT, the Party stated that the key category analysis is being used

[3] FCCC/ARR/2013/LTU, paragraphs 12 and 13.

Issue	*Expert review team assessment*	*ERT findings and recommendations*
		in order to prioritize the development and improvement of the inventory and that this is reflected in the inventory improvement plan. A copy of the plan was provided to the ERT. The ERT encourages the Party to provide a summary of the inventory improvement plan in its NIR, and to indicate where in the plan the key category analysis has been used to prioritize inventory improvements
Assessment of uncertainty analysis		
Approach followed?	Tier 1	
Was the uncertainty analysis carried out in accordance with the IPCC good practice guidance and the IPCC good practice guidance for LULUCF?	Yes	The ERT encourages the Party to improve transparency by providing references to the values of uncertainties ascribed to activity data and emission factors, and, where expert judgement is used to derive these values, to indicate this in the NIR
Quantitative uncertainty (including LULUCF)	Level = ±43.0% Trend = ±8.5%	
Quantitative uncertainty (excluding LULUCF)	Level = ±11.5% Trend = ±2.5%	

Abbreviations: ERT = expert review team, IPCC good practice guidance = the Intergovernmental Panel on Climate Change (IPCC) *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, IPCC good practice guidance for LULUCF = IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry*, LULUCF = land use, land-use change and forestry, NIR = national inventory report.

Inventory management

15. There were no major changes to the inventory management process carried out by the Party for the 2014 annual submission, as indicated by the Party in its NIR. The description of the inventory management process, as contained in the report of the individual review of the annual submission of the Party submitted in 2013,[4] remains relevant.

5. Follow-up to previous reviews

16. In its 2014 annual submission, Lithuania has continued to make improvements to its inventory, in terms of transparency, completeness and accuracy. The Party has addressed most of the recommendations made in the 2013 annual review report (e.g. see paras. 36, 50, 55, 63, 68, 75 and 77 below). The Party's improvements in its 2014 annual submission as a result of the list of the provisional main findings and recommendations provided during the 2013 review are described in annex VII to the NIR, because the previous review report was

[4] FCCC/ARR/2013/LTU, paragraph 17.

not published at the time of submission of the inventory. The ERT commends Lithuania for its efforts to continue to improve its inventory and for transparently reporting on its progress.

17. Recommendations from previous reviews that have not yet been implemented, as well as issues the ERT identified during the 2014 annual review, are discussed in the relevant sectoral chapters of the report and in table 9 below.

B. Energy

1. Sector overview

18. The energy sector is the main sector in the GHG inventory of Lithuania. In 2012, emissions from the energy sector amounted to 11,885.26 Gg CO_2 eq, or 55.0 per cent of total GHG emissions. Since 1990, emissions have decreased by 63.6 per cent. The key driver for the fall in emissions is the transition from a centrally planned to a market-based economy in the beginning of 1990s. The majority of the decrease in GHG emissions from the energy sector occurred during the period 1991–1995 in energy industries, other sectors and manufacturing industries and construction by 8,246.63 Gg CO_2 eq (56.4 per cent), 4,550.18 Gg CO_2 eq (70.1 per cent) and 4,357.18 Gg CO_2 eq (74.2 per cent), respectively. Within the sector, 38.2 per cent of the emissions were from transport, followed by 37.1 per cent from energy industries, 11.7 per cent from other sectors and 10.7 per cent from manufacturing industries and construction. Fugitive emissions from oil and natural gas accounted for 2.3 per cent and other (fuel combustion) accounted for 0.1 per cent. Fugitive emissions from solid fuels are reported as "NO".

19. Lithuania has made recalculations between the 2013 and 2014 annual submissions for this sector. The two most significant recalculations made were in the following categories: transport – CO_2 (increase of 31.55 Gg CO_2, or 0.7 per cent); and other sectors – CO_2 (increase of 25.17 Gg CO_2 or 2.0 per cent). The recalculations were made following changes in activity data (AD) (correction of errors and use of more disaggregated data). Compared with the 2013 annual submission, the recalculations increased emissions in the energy sector for 2011 by 57.51 Gg CO_2 eq (0.5 per cent) and increased total national emissions for the same year by 0.3 per cent. The recalculations were adequately explained, however, there are a number of cases where small inconsistencies occur in the recalculated emissions reported between the NIR and the CRF tables (see also para. 20 below).

20. Lithuania provided in the NIR (chapter 1.6) information on the quality assurance/quality control (QA/QC) plan which was also applied to the energy sector. According to the plan, checking data inputs and references has been accomplished and consistency of data between categories has also been checked. However, the ERT noted inconsistencies in values reported in different CRF tables (see para. 25 below) and a number of cases where small inconsistencies occurred in emissions reported in the NIR and those presented in the CRF tables. For example, there was a discrepancy between CO_2 emissions presented for the sectoral approach in the NIR and the CRF tables. CRF table 1.A(c) for the year 2012 shows the value of CO_2 emissions from all fuels calculated from the sectoral approach as 11,305.33 Gg CO_2, while the NIR states that the CO_2 emissions from the sectoral approach are 11,296 Gg CO_2 (table 3-2, p. 71). In response to a question raised by the ERT during the review, Lithuania provided the required clarification and confirmed that the values reported in the CRF tables are correct. The ERT recommends that the Party improve its quality control (QC) procedures in order to ensure consistency between the values reported in the NIR and the CRF tables.

2. Reference and sectoral approaches

21. Table 5 provides a review of the information reported under the reference approach and the sectoral approach, as well as comparisons with other sources of international data. Issues identified in table 5 are more fully elaborated in paragraphs 23–25 below.

Table 5
Review of reference and sectoral approaches

Issue	*Expert review team assessment*	*Paragraph cross-references*
Difference between the reference approach and the sectoral approach	Energy consumption: −20.04 PJ, −11.80% CO_2 emissions: 197.45 Gg CO_2, 1.75%	
Are differences between the reference approach and the sectoral approach adequately explained in the NIR and the CRF tables?	Yes	
Are differences with international statistics adequately explained?	Yes	
Is reporting of bunker fuels in accordance with the UNFCCC reporting guidelines?	Yes	See paras. 23 and 24 below
Is reporting of feedstocks and non-energy use of fuels in accordance with the UNFCCC reporting guidelines?	Yes	See para. 25 below

Abbreviations: CRF = common reporting format, NIR = national inventory report, UNFCCC reporting guidelines = "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories".

Comparison of the reference approach with the sectoral approach and international statistics

22. No significant problems were identified. Lithuania transparently explained in its NIR (section 3.2.1) the differences between the reference and sectoral approaches.

International bunker fuels

23. In the NIR (p. 120), the Party stated that, following a recommendation made during the review in 2004, all aviation gasoline is assumed to be used for domestic purposes and also stated that "all the rest (gasoline type jet fuel and kerosene type jet fuel) is used for international flights". The ERT noted that, in CRF table 1.A(a), Lithuania reports the use of jet kerosene for civil aviation for the entire time series (25.0 per cent of the total fuel consumption for domestic aviation, or 6.00 TJ in 2012). In response to a question raised by the ERT during the review, the Party acknowledged the error in the explanation provided in the NIR and explained that the NIR should be revised in order to explain that all aviation gasoline and part of jet kerosene are used for domestic purposes, meanwhile the rest of jet kerosene is used for international flights. The ERT recommends that the Party correct the information in the NIR to improve transparency.

24. The ERT noted that the implied emission factor (IEF) for CO_2 from gas/diesel oil used in marine bunker fuels reported in CRF table 1.C (72.89 t/TJ) is below the range of emission factors (EFs) (75.0–77.6 t/TJ) included in the Intergovernmental Panel on Climate Change (IPCC) *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines) (Volume III, table 1-47). In

response to a question raised by the ERT during the review, the Party explained that country-specific CO_2 EFs were applied based on the results of the study "Determination of national GHG emission factors for energy sector", which was prepared by Lithuanian Energy Institute in 2012. Values of country-specific CO_2 EFs for gasoline, diesel, gasoil, jet kerosene and liquefied petroleum gas were determined on the basis of measurements performed by the accredited Laboratory of Quality Research Centre of JSC "ORLEN Lietuva". The ERT welcomes the explanation and recommends that Lithuania improve the transparency of its reporting by including this information in the international bunker fuels section of the NIR.

Feedstocks and non-energy use of fuels

25. According to the NIR (p.75), refinery feedstocks amounted to 30.6 per cent of feedstocks and non-energy use of fuels in 2012. However, the ERT noted inconsistencies between CRF tables 1.A(b) and 1.A(d) for refinery feedstocks. CRF table 1.A(b) uses the notation key not occurring ("NO") for carbon stored in refinery feedstocks. Meanwhile, CRF table 1.A(d) shows fraction of carbon stored as 0.5 and carbon stored in non-energy use of fuels as "NO" for refinery feedstocks. In response to a question raised by the ERT during the review, the Party explained that in the Lithuanian statistics, the refinery feedstocks include the following types of fuel: refinery feedstock, semi-finished products of oil refining and additives/oxygenates. The crude oil and refinery feedstocks are used for the production of various oil products (diesel, gasoline, gasoil, residual fuel oil, etc.). The Party further explained that following the recommendations made during an in-country review (in 2012), the Party reported the refinery feedstocks as "NO" in CRF table 1.A(b). The carbon stored is reported as 0.5 due to a mistake, whereas the use of the notation key "NO" in CRF tables 1.A(b) and 1.A(d) is correct. The ERT acknowledges the explanation and recommends that Lithuania correct the information regarding the refinery feedstocks in CRF table 1.A(d) and include relevant explanations in the NIR to improve transparency.

3. Key categories

Stationary combustion: liquid and gaseous fuels – CO_2

26. Lithuania used a combination of tier 2 and 3 methods to estimate CO_2 emissions from public electricity and heat production. For the tier 2 method, country-specific EFs were based on the study "Determination of national GHG emission factors for energy sector". The ERT considered that this is consistent with the IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance). For the tier 3 method, plant-specific EFs based on data from the European Union Emissions Trading System (EU ETS) were used. However, the NIR did not provide enough details on how EU ETS EFs were selected and used. In response to a question raised by the ERT during the review, the Party provided the required information on the use of the EU ETS data. The ERT recommends that Lithuania include a more detailed explanation on the selection of the plant-specific EFs in the NIR, to improve transparency.

27. In the NIR (p. 86), for the subcategory petroleum refining, the Party has reported that CO_2 emissions were calculated applying the tier 2 or tier 3 methodology. For the tier 3 approach, the Party used plant-specific EFs based on EU ETS data. Using plant-specific EFs is in accordance with the IPCC good practice guidance. However, the ERT considers that the NIR was not sufficiently transparent regarding how EU ETS EFs were selected and used. In response to a question raised by the ERT during the review, the Party provided the required information on the use of the EU ETS data for the EFs. The ERT recommends that the Party include a more detailed explanation on the selection of the plant-specific EFs in the NIR to improve transparency.

Stationary combustion: biomass – CH_4

28. For the subcategory other sectors, Lithuania reported in its NIR (tables 3-49, 3-51 and 3-53) that CH_4 emissions were calculated applying the tier 1 methodology for all biomass fuels except biogas. The ERT noted that the IPCC good practice guidance (figure 2.3) recommends the use of IPCC tier 2 EFs for key categories if national or regional EFs are unavailable. However, the ERT also noted that the Revised 1996 IPCC Guidelines (tables 1-18 and 1-19) do not provide tier 2 EFs for all biomass types or all combustion technologies. In response to a question raised by the ERT during the review, the Party explained that the country-specific EFs for CH_4 emissions from biomass for the category were not available due to a lack of sufficient measurement data according to technology and fuel type. Therefore, the default EFs from the Revised 1996 IPCC Guidelines were used. The Party also informed the ERT that it is currently investigating the possibility of applying either appropriate EFs for the category from internationally referenced sources or relevant EFs from neighbouring countries. The ERT commends the Party for its efforts in searching for appropriate EFs for the category and encourages the Party to continue its efforts in moving towards the tier 2 methodology and to provide a progress update in the NIR.

C. Industrial processes and solvent and other product use

1. Sector overview

29. In 2012, emissions from the industrial processes sector amounted to 3,627.40 Gg CO_2 eq, or 16.8 per cent of total GHG emissions, and emissions from the solvent and other product use sector amounted to 83.74 Gg CO_2 eq, or 0.4 per cent of total GHG emissions. Since the base year, emissions have decreased by 18.7 per cent in the industrial processes sector, and decreased by 57.6 per cent in the solvent and other product use sector. The trend, which fluctuates, is dominated by the emissions from chemical industry, in particular from ammonia production. The largest emission reductions in the sector occurred between 1991 and 1993, due to the reduction of emissions from mineral products owing to the transition from a centrally planned to a market-based economy. Emissions from the consumption of halocarbons and SF_6 have increased between 1993 and 2012. Within the industrial processes sector, 80.4 per cent of the emissions were from the chemical industry, followed by 12.5 per cent from mineral products, 6.7 per cent from consumption of halocarbons and SF_6 as well as 0.2 per cent from other production. The remaining 0.1 per cent were from metal production. Lithuania reported emissions from production of halocarbons and SF_6 and from other (industrial processes) as "NA, NO" and "NA", respectively.

30. Lithuania has made recalculations between the 2013 and 2014 annual submissions for the industrial processes sector. The two most significant recalculations for 2011 were in the following categories: CO_2 emissions from soda ash use (increase in emissions of 0.49 Gg CO_2 or 104.5 per cent), which were recalculated for 2010 and 2011 due to change in AD (overall soda ash use has been determined via apparent consumption (import minus export) instead of extrapolation); and HFC emissions from refrigeration and air-conditioning equipment (increase in emissions of 0.32 Gg CO_2 eq or 0.2 per cent), which were recalculated for the period 2001–2011 based on updated information on the number of inhabitants, the average size of households and the percentage of households using domestic refrigerators, as well as updated information from two companies on commercial refrigeration. Compared with the 2013 annual submission, the recalculations increased emissions in the industrial processes sector for 2011 by 1.17 Gg CO_2 eq (0.03 per cent) (see also para. 40 below). For 1990, the inclusion of CO_2 emissions from methanol production

(see para. 31 below) increased emissions by 61.10 Gg CO_2. The recalculations were adequately explained in the NIR.

31. CO_2 emissions from road paving with asphalt and from methanol production (for 1990–1998 and 2000–2008, other years are reported as "NO") are reported for the first time in the Lithuanian inventory. The ERT commends Lithuania for this improvement in the completeness of its inventory.

2. Key categories

Ammonia production – CO_2

32. The NIR (p. 191) indicates that at the single Lithuanian ammonia production plant, natural gas usage is measured at the point of delivery to the plant, so the flows for combustion/heating and the ammonia production process are not separately measured. The NIR also indicates that the Party uses a method from the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the 2006 IPCC Guidelines), in which 'total fuel requirement', including the amount of natural gas used for both combustion/heating and as feedstock, is used. In response to a question raised by the ERT during the review, Lithuania indicated that the statement in the NIR concerning the measured natural gas flow is incorrect. The Party explained that the data on natural gas consumption in ammonia production have recently been analysed in detail and it emerged that the company provides data on consumption of natural gas as feedstock and that amount is used in the calculations in the industrial processes sector. The Party also explained that the emissions from the ammonia production plant occurring due to the combustion of natural gas are included in two categories in the energy sector: (i) public electricity and heat production for fuel used to produce heat and electricity in a combined heat and power plant, and (ii) chemicals for fuel used in a boiler to produce heat for the ammonia production plant only. The ERT recommends that the Party improve the transparency of its reporting by correcting the errors in its NIR regarding the data and method used for the estimation of emissions from ammonia production.

33. In response to a question raised by the ERT during the review, the Party also explained that a country-specific CO_2 EF for natural gas (55.23 t CO_2/TJ) was developed in 2012 based on the results of the study "Determination of national GHG emission factors for energy sector" prepared by the Lithuanian Energy Institute. The Party also explained that a summary of this study is provided in annex IV of the NIR 2014. This EF is used consistently in the energy sector for emissions from combustion of natural gas and in the industrial processes sector for ammonia production emission estimates. The ERT noted that there is an error in the CRF table summary 3, in which the CO_2 EF for chemical industry is reported as "PS" (plant specific), whereas the ERT considers that the EF used for ammonia production is "CS" (country specific). The ERT recommends that Lithuania correct the notation key on the EF and reiterates the recommendation made in the previous review report that Lithuania provide more accurate and transparent information on the EF in the NIR in line with the information provided during the review, to improve transparency. The ERT also recommends that the Party improve its QC procedures in order to rectify errors in the NIR (as indicated in para. 32 above) and the CRF tables.

Consumption of halocarbons and SF_6 – HFCs and SF_6[5]

34. Lithuania has largely and progressively improved the accuracy and completeness of the estimates for the consumption of halocarbons and SF_6 since the elaboration of the study

[5] SF_6 emissions from this category are not key. However, since all issues related to this category are discussed as a whole, the individual gases are not assessed in separate sections.

"Analysis of the Use of Fluorinated Greenhouse Gases in Lithuania in 1990–2011" in 2012. The ERT commends Lithuania for this significant improvement.

35. Lithuania did not report in the NIR on any category-specific QA/QC procedures for refrigeration and air-conditioning equipment. In response to a question raised by the ERT during the review, the Party explained that category-specific QC procedures for the refrigeration and air-conditioning equipment subcategory were not conducted in this submission. However, the ERT noted that HFC emissions from refrigeration and air-conditioning equipment are a key category and had been recalculated in this submission. The ERT noted that, according to the UNFCCC reporting guidelines, category-specific QC procedures (tier 2) should be applied for key categories as well as for those individual categories in which significant methodological changes and/or data revisions have occurred. The ERT also noted that the relevance of this category is increasing during the time series and that the Party has used assumptions for the elaboration of the estimates. Therefore, the ERT encourages Lithuania to apply category-specific QC procedures for this category on an annual basis.

36. Lithuania has followed the recommendations made in the previous review report to report in CRF table 2(II).F information on AD and IEFs for foam blowing, semiconductor manufacture, electrical equipment and other (non-specified). The ERT commends the Party for the improved transparency of its reporting.

3. Non-key categories

Lime production – CO_2

37. According to the IPCC good practice guidance, CO_2 emissions from lime production as a non-market intermediate at sugar mills should be reported under category lime production and omission of these data may lead to an underestimation of emissions (p. 3.23). On page 168 of the NIR, Lithuania indicates that it has assumed that 90 per cent of the lime used in the sugar industry is precipitated as calcium carbonate ($CaCO_3$) and only the part of calcium oxide (CaO) not recovered as $CaCO_3$ is reported as AD and the CO_2 emissions are estimated accordingly. In response to questions raised by the ERT during the review, the Party indicated that lime is produced in the sugar production plants, but CO_2 is not emitted as it is directly provided to the carbonation tank. During the purification of the sugar juice, CO_2 and slaked lime are introduced into the liquid to form $CaCO_3$ and to precipitate and remove impurities (the process is also described in a "best available techniques" (BAT) document).[6] The Party further explained that, according to discussion with experts from the sugar companies, all lime used precipitates as $CaCO_3$ and therefore the emissions of CO_2 do not occur or are negligible. Therefore the Party considers that the approach used is conservative. Precipitated $CaCO_3$ is used for the liming of soils and the associated CO_2 emissions are reported in the LULUCF sector.

38. The ERT considers that the statement that 90 per cent of the lime used in sugar industry is precipitated as $CaCO_3$ has not been supported by sufficient evidence. The ERT noted that the BAT reference document (see para. 37 above) does not provide any evidence to support the assumption of 90 per cent or full carbonation. Further, no proven data from the companies were provided to support an assumption of 100 per cent precipitation. The ERT also noted that the information in the page 3.23 of the IPCC good practice guidance, as well as information in the 2006 IPCC Guidelines, suggests that not all CaO is

[6] Integrated Pollution Prevention and Control (2006). Reference Document on Best Available Techniques in the Food, Drink and Milk Industries (chapter 2.1.4.11.3, Description of techniques, methods and equipment, p. 33) available at <http://eippcb.jrc.ec.europa.eu/reference/BREF/fdm_bref_0806.pdf>.

recarbonated to limestone in the refining process at sugar refineries. This means that the foam/scum waste after the refining process contains CaO (up to 24 per cent of the input has been reported by other Parties) and not all CO_2 is converted.

39. The ERT concluded that the assumption that 90 per cent of CaO is recovered as $CaCO_3$ may lead to an underestimation of CO_2 emissions in the category lime production, and the estimates provided are not in line with IPCC good practice guidance and therefore included this issue in the list of potential problems and further questions from the ERT.

40. In response to the list of potential problems and further questions from the ERT, Lithuania presented a limestone chemical analysis in "Material safety data sheets" for sugar factory lime, which were provided by sugar companies. Lithuania also provided revised estimates of CO_2 emissions from lime production in sugar refining plants, assuming that 86.0 per cent of CaO is recovered as $CaCO_3$. This assumption is based on the data provided by sugar companies showing that $CaCO_3$ content of the limestone used in sugar refineries is, on average, 97.0 per cent and $CaCO_3$ content of the lime after the saturation/carbonation process is, on average, 83.9 per cent. Based on these data, the Party assumes that 14.0 per cent of CaO is not recovered as $CaCO_3$. The Party submitted revised estimates on 28 October 2014 for the entire time series to incorporate the changes in estimated emissions from lime production in the sugar industry. The ERT agreed with the revised estimates, which resulted in an increase in emissions of 0.15–0.55 Gg CO_2 eq per year (on average, 1.0 per cent increase in emissions from lime production) in the entire time series (0.47 Gg CO_2 in 2012). The ERT recommends that Lithuania explain the methodology and data sources used in the NIR.

Soda ash production and use – CO_2

41. Lithuania reports in the NIR (section 4.2.4.1) that, in 2010, Statistics Lithuania stopped collecting statistical data on the total consumption of soda ash, which was used to estimate emissions for 1990–2009. In response to a question raised by the ERT during the review, Lithuania informed the ERT that it uses new statistics on the balance of imports and exports in order to estimate emissions for the period 2010–2012. Therefore, the estimates strongly depend on the data on the amount of imported/exported soda ash and the amount of stored soda ash. Furthermore, the Party explained that in Lithuania around 75 per cent of soda ash is used in the glass production industry, where these emissions are reported. The other uses of soda ash are not available by user. In order to increase the accuracy of the estimates and improve the time-series consistency, the ERT encourages Lithuania to collect data on soda ash use by end use and to use these data in the emission estimates.

Iron and steel production – CO_2

42. In the NIR (section 3.3.1) and in response to a question raised by the ERT during the review, Lithuania explained that there is no production of steel in Lithuania. Cast iron is produced in blast furnaces and in electric arc furnaces (EAFs) that use pig iron as a raw material. The EAF operation was ceased in 2010. CO_2 emissions from coke used in blast furnaces were estimated using a tier 1 method and a default CO_2 EF (3.1 t CO_2/t reducing agent) from the IPCC good practice guidance. Lithuania explained in the NIR (section 4.4.1.2) that, as there is no clear methodological description and EF provided in either the Revised 1996 IPCC Guidelines or the IPCC good practice guidance for cast iron production from pig iron in EAFs, Lithuania applied a tier 1 method and a default EF (0.08 t CO_2/t steel) for steel produced in EAFs from the 2006 IPCC Guidelines. The ERT noted from the information in the NIR that in Lithuania cast iron is produced only from iron scrap, but the default EFs used by the Party are applicable for production from iron ores in blast furnaces and for production of steel in EAFs, and therefore the ERT concluded that there is a potential overestimation of emissions. In order to increase the accuracy of the estimates, demonstrate that no double counting or omission has occurred and to improve the

transparency, the ERT recommends that Lithuania carry out an analysis of the potential overestimation and provide a discussion on this subject in the NIR (for instance, by providing a qualitative carbon balance showing carbonaceous inputs and outputs to demonstrate which reducing agents and fuel sources are consumed for cast iron production in both blast furnaces and iron foundries/EAFs in Lithuania).

Solvent and other product use – N_2O

43. Lithuania reported N_2O emission from other (solvent and other product use) as "NE" (not estimated) for all subcategories except use of N_2O for anaesthesia. In response to a question raised by the ERT during the review, Lithuania explained that during the inventory preparation it had tried to collect data to estimate N_2O emissions from uses other than anaesthesia. Data on total N_2O sold in Lithuania is not collected by Statistics Lithuania, so the Party tried to collect data from the companies. One of the leading selling companies registers N_2O amounts sold for medical purposes and data are available since 1999. N_2O sold for other purposes is not recorded, as it is registered by that company under a general category 'special gases'. Lithuania also explained that, for the next annual submission, it plans to further investigate the possibility to estimate these emissions. The ERT welcomes the Party's plan to collect data and elaborate estimates on N_2O emissions and encourages the Party to adhere to this plan in order to improve the completeness of its emissions inventory.

D. Agriculture

1. Sector overview

44. In 2012, emissions from the agriculture sector amounted to 5,059.98 Gg CO_2 eq, or 23.4 per cent of total GHG emissions. Since 1990, emissions have decreased by 50.8 per cent. The key driver for the fall in emissions is the reduction in agricultural production, cattle and swine in particular, which occurred due to the restructuring of the farming sector during the transition from a centrally planned to a market-based economy. Within the sector, 61.4 per cent of the emissions were from agricultural soils, followed by 23.4 per cent from enteric fermentation and 15.2 per cent from manure management. Emissions from rice cultivation, prescribed burning of savannas, field burning of agricultural residues and other (agriculture) were reported as "NO".

45. The Party has made recalculations between the 2013 and 2014 annual submissions for this sector. The recalculations were in the following categories: enteric fermentation (increase of 15.23 Gg CO_2 eq or 1.3 per cent), manure management (increase of 5.68 Gg CO_2 eq or 0.8 per cent) and agricultural soils (decrease of 14.03 Gg CO_2 eq or 0.5 per cent). The recalculations were made primarily due to changes to the weight as well as the nitrogen (N) intake and retention of dairy cattle, and an update to sewage sludge AD. Compared with the 2013 annual submission, the recalculations increased emissions in the agriculture sector for 2011 by 6.88 Gg CO_2 eq (0.1 per cent) and increased total national emissions by 0.03 per cent. The recalculations were adequately explained.

46. The ERT reiterates the following recommendations made in the previous review report, that the Party: (i) improve the completeness and QC of reporting in the CRF tables (e.g. table 4.A, table 4.B(a) (see paras. 51 and 53 below) and table 4.D); (ii) provide in the NIR an explanation for the difference in animal population numbers between the inventory and the data of the Food and Agriculture Organization of the United Nations; (iii) continue to investigate the differences between the national data on synthetic fertilizer consumption provided by UAB Agrochema and the data provided by the International Fertilizer Industry Association.

47. The previous review reports (2012 and 2013) included recommendations that Lithuania provide more detailed information on the uncertainties of AD and EFs used in the uncertainty analysis. The ERT considers that, as primarily default EFs are used and the uncertainties applied are derived from the IPCC good practice guidance, the information provided in the current submission on the uncertainties of EFs is adequate. However, although information is provided in the NIR regarding the basis of uncertainties for components of the AD, it is not clear for the manure management category how the overall AD uncertainties have been derived. In response to a question raised by the ERT during the review, Lithuania informed the ERT that equation 6.4 of the IPCC good practice guidance was used to combine the uncertainties associated with animal numbers, waste allocations and the methane producing capacity (Bo) for CH_4 and the excreted N for N_2O. The ERT recommends that Lithuania include this information in the NIR to improve transparency.

2. Key categories

Enteric fermentation – CH_4

48. Lithuania uses a tier 2 method with country-specific parameters to estimate the gross energy intake (GEI) of cattle, swine and sheep. The gross energy (GE) content of feed (MJ/kg) is calculated from the crude protein, crude fat, crude fibre and N-free extracts (g/kg dry matter) in common feeds. GEI is then estimated based on GE content of feed and the dry matter intake (DMI) of each animal subcategory. DMI is derived from weight, weight gain and the feed accumulation standards provided in the national reference book of livestock production. In response to a question raised by the ERT during the review, Lithuania clarified that while the DMI for sheep was based on the national feed standards it was derived from generalized sheep types because average weight/weight gain data were not available. The ERT considers that this country-specific approach is in line with the IPCC good practice guidance. The ERT recommends that Lithuania provide additional information in the NIR on the approach used to estimate DMI for sheep to improve transparency.

49. The ERT noted that, as the animal and feed characteristics do not change over time (with the exception of dairy cattle), the variation in the average GEI reflects changes in the relative proportion of the different animal subcategories. The NIR (section 6.2) only provides the aggregate average animal and feed characteristics for cattle and swine, while no information is provided for sheep. This makes it difficult for an ERT to assess the appropriateness of the GEI estimates. In response to a question raised by the ERT during the review, Lithuania provided the specific intakes per animal subcategory and feed characteristics for dairy and non-dairy cattle, swine and sheep. The ERT recommends that Lithuania include in the NIR the specific animal and feed characteristics and DMIs per subcategory rather than the aggregate values, to improve the transparency of this country-specific method.

50. The ERT commends Lithuania for implementing revised weights for dairy cattle to reflect the increasing average size of animals over the time series, following a recommendation made in the previous review report. The revised weights were estimated from the mix of different cattle breeds and their average weights based on expert judgement and values from the literature. In response to a question raised by the ERT during the review, Lithuania informed the ERT that weights were determined for 1990 and 2012 and interpolation was used to derive values for intervening years. Lithuania reports in the NIR (section 6.2.6) that the collection of more accurate data on cattle weights is planned for the future.

51. The NIR does not specify what methane conversion rate (Ym) is applied for sheep and swine. In CRF table 4.A the Ym for sheep and swine is reported as "NA" (not applicable). The ERT back-calculated the Ym from the GEI and EFs reported in the NIR

and was able to confirm with Lithuania during the review that the IPCC default values of 0.6 per cent for swine (from the Revised 1996 IPCC Guidelines) and 7 per cent and 6 per cent for mature sheep and lambs, respectively (IPCC good practice guidance) were applied. The ERT recommends that Lithuania provide the Ym values for sheep and swine in both the NIR and the CRF tables to improve transparency.

Manure management – CH_4 and N_2O

52. Lithuania uses a tier 2 method to estimate CH_4 emissions from manure management. A methane conversion factor (MCF) of zero is applied to anaerobic lagoons with digesters. The previous review report recommended that Lithuania further investigate this issue and ensure that the method applied accounts for any leakage or non-combustion of CH_4. In response to a question raised by the ERT during the current review, Lithuania informed the ERT that additional information was sought from the biogas plant. The response from the company stated that there was no leakage/release of CH_4 from the system. The ERT noted that, as the processing of pig slurry in the biogas plant ceased in 2011, it will be not possible for Lithuania to undertake more detailed analysis of the plant's efficiency. The ERT recommends that, in order to improve transparency, Lithuania note in the NIR that the MCF of zero was based on information provided by the biogas plant that all CH_4 was collected and combusted.

53. The value for Bo for sheep manure is not provided in either the NIR or CRF table 4.B(a) (where it is reported as "NA"). In response to a question raised by the ERT during the review, Lithuania informed the ERT that the default value of 0.19 m^3 CH_4/kg volatile solids from the Revised 1996 IPCC Guidelines was used. The ERT recommends that the Bo for sheep be reported in both the NIR and the CRF tables to improve transparency.

54. Lithuania uses tier 2 methods and an enhanced livestock characterization to estimate enteric fermentation and manure management CH_4 emissions from sheep. However, for manure management N_2O emissions the tier 1 method with default N excretion rates from the Revised 1996 IPCC Guidelines is applied. The IPCC good practice guidance states (on p. 4.8) than an 'enhanced' characterization should be used to estimate emissions across all the relevant sources if the tier 2 method is used for either enteric fermentation or manure. Although the N_2O emissions from sheep are small in Lithuania (6.72 Gg CO_2 eq in 2012), the ERT considers that it is possible for Lithuania to estimate the N intake of each of the sheep subcategories from the information used to estimate GEI (N intake = crude protein intake/6.25). The ERT recommends that Lithuania explore the possibility of applying the tier 2 method for the manure management N_2O emissions from sheep.

55. Lithuania has followed the recommendation made in the previous review report to correct the reporting on the animal waste management systems in CRF table 4.B(a). The ERT commends Lithuania for this improvement.

E. Land use, land-use change and forestry

1. Sector overview

56. In 2012, net removals from the LULUCF sector amounted to 8,076.62 Gg CO_2 eq. Since 1990, net removals have increased by 88.1 per cent. The key driver for the rise in removals during 1990–2012 is the increase in removals in the category forest land remaining forest land and the decrease of emissions from cropland. Within the sector, 9,514.68 Gg CO_2 eq of net removals were from forest land, followed by 2,883.48 Gg CO_2 eq from grassland. Net emissions were reported from cropland (3,836.23 Gg CO_2 eq), 278.55 Gg CO_2 eq from settlements and 139.10 Gg CO_2 eq from other land. Net emissions from wetlands accounted for 67.65 Gg CO_2 eq.

57. Lithuania has made recalculations between the 2013 and 2014 annual submissions for this sector. The two most significant recalculations made by Lithuania between the 2013 and 2014 annual submissions were in the following categories: cropland (decrease of 25.67 Gg CO_2 or 0.7 per cent) and grassland (decrease of 41.25 Gg CO_2 or 1.3 per cent). The recalculations were made due to: redistribution of the total area of organic soils to exclude organic soils from other land converted to cropland and other land converted to grassland; subsequent estimation of carbon stock changes in mineral soils for other land converted to cropland and other land converted to grassland. The recalculations were adequately explained in the NIR (pp. 390 and 397). Compared with the 2013 annual submission, the recalculations increased removals in the LULUCF sector for 2011 by 91.14 Gg CO_2 eq (0.9 per cent).

58. The previous review report noted that Lithuania had improved its uncertainty analysis for several categories in the LULUCF sector and included a recommendation that Lithuania extend the improvements made in uncertainty analysis to all categories, also noting that the Party indicated that it plans to further improve uncertainty assessment for cropland and grassland. In the 2014 annual submission, Lithuania reported the uncertainty assessment in the same manner as it did in its 2013 annual submission. In response to a question raised by the ERT during the review, the Party stated that the improvement of the uncertainty assessment is ongoing. Lithuania has planned to improve uncertainty estimates through the Norway Grants partnership project. The ERT commends the Party for its initiative and encourages Lithuania to use the outcomes of this project in its uncertainty analysis.

2. Key categories

Forest land remaining forest land – CO_2

59. Lithuania has reported in the NIR (p. 358) that the stock change method has been applied for the estimation of carbon stock changes in living biomass, which is in line with the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF). Since 2007, Lithuania has used the national forestry inventory (NFI) permanent sample plot grid for monitoring land-use changes and for the estimation of the most important forest characteristics due to the beginning of remeasurement of NFI permanent sample plots. In response to a question raised by the ERT during the review, Lithuania explained that data for 1990–2007 were interpolated. The NFI plots annually cover the entire country, with the total number of plots measured over the five-year inventory cycle, which may lead to the inter-annual variations. The ERT recommends that the Party further explore different opportunities regarding how the data presented in NFI could be allocated during the five-year inventory cycle in order to reduce inter-annual variation.

Cropland remaining cropland – CO_2

60. Lithuania has reported carbon stock changes in living biomass using the tier 1 method, and the estimate covers only perennial woody crops. The trend in carbon stock change in living biomass per area fluctuates and several large inter-annual changes have been identified during the period 2008–2012: from 0.0008 Mg C/ha to –0.0027 Mg C/ha in 2008/09 (–451.0 per cent), with further inter-annual changes of 149.2 per cent in 2009/10, –50.3 per cent in 2010/11 and 95.2 per cent in 2011/12. In response to a question raised during the earlier stages of the review, the Party explained that these inter-annual changes occur due to its use of estimated distribution of age groups. Lithuania also stated that it plans to eliminate such variation by obtaining actual age group data from the NFI. The ERT encourages the Party to make efforts to obtain this data and use it for the calculation of carbon stock changes in living biomass.

3. Non-key categories

Land converted to wetlands – CO_2

61. Lithuania has reported "NE" for carbon stock changes in living biomass for cropland and grassland converted to wetlands for 1991 to 2012 (the Party has reported "NO" for 1990). At the same time, the Party has provided areas for these subcategories in CRF table 5.D (e.g. 2,397 ha for cropland converted to wetlands and 5,592 ha for grassland converted to wetlands in 2012), and reports in the NIR (p. 398) that managed wetlands are used for peat extraction. The ERT noted that the IPCC good practice guidance for LULUCF provides a method for the estimation of carbon stock changes in living biomass for land converted to peat extraction. The ERT strongly recommends that Lithuania report the carbon stock changes in living biomass in cropland and grassland converted to wetlands.

Non-CO_2 emissions from drainage of soils and wetlands – CH_4 and N_2O

62. In CRF table 5(II), Lithuania reports area and CH_4 and N_2O emissions from drainage of soils and wetlands in forest land – mineral soil as "NE" for the entire time-series. However, according to the NIR (pp. 347 and 348) drained mineral forest soils do not exist in Lithuania. The ERT recommends that the Party use the notation key "NO" instead of "NE" to improve transparency.

Biomass burning – CO_2, CH_4 and N_2O

63. The ERT commends the Party for addressing the recommendation made in the previous review report that, in CRF table 5(V), the Party report the CO_2 emissions associated with wildfires in forest land remaining forest land and land converted to forest land as "IE" (included elsewhere), because it uses the carbon stock change method to estimate carbon stock changes from living biomass.

64. Lithuania reported in the NIR (p. 363) that the CH_4 and N_2O EFs from biomass burning for forest land remaining forest land are 0.11 g/kg dry matter for CH_4 and 8.05 g/kg dry matter for N_2O and stated that the values were from the IPCC good practice guidance for LULUCF (table 3A.1.16). However, the ERT noted that the reported values were different from those in the table that the Party had referred to in its NIR. In response to questions raised by the ERT during the review, the Party provided the detailed calculation of CH_4 and N_2O emissions from biomass burning for forest land remaining forest land for the whole time series (1990–2012) and confirmed that the use of CH_4 and N_2O EFs is in line with the IPCC good practice guidance for LULUCF, even though it is incorrectly reported in the NIR. However, Lithuania has not applied the combustion efficiency factor included in equation 3.2.20 in the IPCC good practice guidance for LULUCF. In response to a question raised by the ERT during the review, the Party explained that a default combustion efficiency factor was not applied and that this leads to an overestimation of emissions. Lithuania explained that it is planning to develop country-specific parameters for the estimation of emissions from biomass burning. Furthermore, the Party stated that the methodology for the estimation of available fuel for wildfires, including deadwood and litter, has been established in cooperation with the Directorate General of State Forests and the provisional data were already received in 2014, but it was not yet used for the 2014 submission as analysis of the data has not as yet been completed. The ERT commends Lithuania for this progress and recommends that the Party use the country-specific data and methodology that takes into account combustion efficiency values or use default values for combustion efficiency when estimating emissions from biomass burning.

F. Waste

1. Sector overview

65. In 2012, emissions from the waste sector amounted to 966.38 Gg CO_2 eq, or 4.5 per cent of total GHG emissions. Since 1990, emissions have decreased by 13.9 per cent. The key drivers for the fall in emissions are the decrease in emissions from solid waste disposal on land due to the decrease in the landfilling of biodegradable municipal waste and biodegradable waste of industrial and commercial origin, and the beginning of landfill gas recovery in 2008. Also the emissions from wastewater handling have decreased since 1991 in particular due to reduced emissions from septic tanks as a result of an increase in the percentage of the population connected to sewerage networks. Within the sector, 81.7 per cent of the emissions were from solid waste disposal on land, followed by 18.1 per cent from wastewater handling and 0.2 per cent from waste incineration.

66. Lithuania has not made major recalculations for the sector between the 2013 and 2014 annual submissions. However, emissions from solid waste disposal on land and wastewater treatment were recalculated due to revisions in AD. Compared with the 2013 annual submission, the recalculations in the waste sector increased emissions by 0.60 Gg CO_2 eq (0.1 per cent) in 2011. The recalculations were adequately explained.

2. Key categories

Solid waste disposal on land – CH_4

67. Lithuania used the first-order decay (FOD) method from the 2006 IPCC Guidelines to estimate CH_4 emissions from solid waste disposal on land. Lithuania has included justifications in the NIR (pp. 438–441) on the use of the FOD method from the 2006 IPCC Guidelines by pointing out that the 2006 IPCC Guidelines provide more detailed and updated default parameters on fraction of degradable organic carbon dissimilated (DOC_f), degradable organic carbon (DOC) for each waste type and CH_4 generation rate constant (k). The ERT considers that Lithuania's use of the FOD method from the 2006 IPCC Guidelines is in line with the IPCC good practice guidance.

68. Following the recommendation made in the previous review report, Lithuania has provided more information on the assumptions for the estimation of quantities of disposed wastes, including industrial and commercial wastes for the period 1950–1989 in the NIR (pp. 431 and 432). The ERT commends Lithuania for improving the transparency of its inventory.

69. Lithuania reported in the NIR (p. 408) that the disposal of waste in the old landfills, which did not meet environmental protection and health safety requirements, stopped in July 2009 and since then all waste is disposed of in 11 regional non-hazardous waste landfills. The ERT noted that the amount of solid waste used in the estimation of emissions and its distribution between different landfills is not transparently reported. In response to a question raised by the ERT during the review, Lithuania provided the amount of solid waste disposed in each category of solid waste disposal site (SWDS), that is, old landfills (managed, unmanaged deep >5 m, unmanaged shallow <5 m) and new regional landfills, in the time series 1990–2012. The ERT recommends that Lithuania improve the transparency of its reporting by including the amount of solid waste disposed in each category of SWDS in the NIR.

70. Lithuania has reported the amount of disposed sewage sludge in the NIR (table 8-13, p. 423) and mentioned that separate values of parameters were applied for different types of landfills. The ERT noted that the distribution of the sewage sludge between different landfills is not transparently reported. In response to a question raised by the ERT during the review, Lithuania provided the amount of sewage sludge disposed in unmanaged deep

and unmanaged shallow landfills in the time series 1990–2012. The ERT recommends that Lithuania improve the transparency of its reporting by including the amount of sewage sludge disposed in each category of SWDS in the NIR.

Wastewater handling – CH_4

71. Lithuania has reported in the NIR (p. 449, section on wastewater discharge) that data on wastewater discharge reported to Lithuanian Environmental Protection Agency are used in the emission estimates. However, for 1992, the reported biochemical oxygen demand (BOD) load to the Raseiniai wastewater treatment plant was considered to be incorrect, as it was about 100 times higher than what would be expected based on typical per capita BOD generation. Therefore, the value was corrected before it was used in the inventory. The ERT noted that in the NIR (p. 447) it is stated that industrial wastewater is discharged to centralized municipal sewage collection networks and treated together with municipal wastewater. In response to a question raised by the ERT during the review, Lithuania confirmed that no distinction is made between discharges from municipal and industrial sources and that BOD is measured at the wastewater treatment plant where municipal and industrial wastewaters have already been mixed. The ERT considers that the explanation provided in the NIR on the corrected BOD load based on only per capita BOD generation is not appropriate, and therefore recommends that Lithuania include in its NIR the information on the contribution of BOD load from industrial wastewater in order to improve transparency.

72. Lithuania has reported in the sectoral background table for wastewater handling (CRF table 6.B) the shares of handling systems for domestic wastewater using the notation key "NE". This is inconsistent with the information in the NIR (table 8-34, p. 448) which shows CH_4 emissions from wastewater treatment (aerobic) and septic tanks (anaerobic) separately. The ERT recommends that Lithuania report the percentages of handling systems for wastewater in CRF table 6.B or, if data are not available, provide a justification for the use of the notation key "NE" to improve transparency.

G. Supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol

1. Information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol

Overview

73. Table 6 provides an overview of the information reported and parameters selected by Lithuania under Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

Table 6

Supplementary information reported under Article 3, paragraphs 3 and 4, of the Kyoto Protocol

Issue	*Expert review team assessment, if applicable*	*Findings and recommendations*
Assessment of the Party's reporting in accordance with the requirements in paragraphs 5–9 of the annex to decision 15/CMP.1	Sufficient	
Activities elected under Article 3, paragraph 4, of the Kyoto Protocol	Activities elected: forest management Years reported: 2008, 2009, 2010, 2011, 2012	
Period of accounting	Commitment period accounting	

Issue	*Expert review team assessment, if applicable*	*Findings and recommendations*
Party's ability to identify areas of land and areas of land-use change in accordance with paragraph 20 of the annex to decision 16/CMP.1	Sufficient	

74. Chapter G.1 includes the ERT's assessment of the 2014 annual submission against the Article 8 review guidelines and decisions 15/CMP.1 and 16/CMP.1. In accordance with decision 6/CMP.9, Parties will begin reporting of KP-LULUCF activities in the submissions due by 15 April 2015 using revised CRF tables, as contained in the annex to decision 6/CMP.9. Owing to this change in the CRF tables for KP-LULUCF activities, and the change from the first commitment period to the second commitment period, paragraphs 75–78 below contain the ERT's assessment of the Party's adherence to the current reporting guidelines and do not provide specific recommendations for reporting these activities in the 2015 annual submission.

75. The ERT noted that in the 2014 annual submission the Party addressed the recommendation made in the previous review report regarding the reporting of CO_2 emissions from biomass burning from wildfires under afforestation/reforestation and forest management as "IE" in CRF table 5(KP-II)5. As explained in paragraph 64 above, Lithuania has not used the combustion efficiency factor in its estimation of CH_4 and N_2O emissions from biomass burning, which leads to an overestimation of emissions. The Party is planning to develop a country-specific method or to use the IPCC default combustion efficiency factor in order to rectify this error.

Activities under Article 3, paragraph 3, of the Kyoto Protocol

Afforestation and reforestation – CO_2

76. Lithuania has applied method 2 in combination with approach 3 for land representation, in line with the IPCC good practice guidance for LULUCF, with great precision using wall-to-wall mapping. The Party has used growing stock volume for the estimation of carbon stock changes in above- and below-ground living biomass. Lithuania has reported "NO" for carbon stock change in dead wood, assuming that it is equal to zero based on data from the NFI. The net removals from afforestation and reforestation activities increased from 115.58 Gg CO_2 eq in 2008 to 195.86 Gg CO_2 eq in 2012 due to an increase in the areas, for instance, due to the introduction of a European Union (EU) support scheme for afforestation and reforestation. The ERT commends the Party for providing transparent and sufficient information regarding the methods used for land representation and the estimation of carbon stock changes in all pools on the afforested and reforested lands in the NIR, in line with decisions 15/CMP.1 and 16/CMP.1 and the IPCC good practice guidance for LULUCF.

Deforestation – CO_2

77. The ERT noted that the Party has addressed the strong recommendation made in the previous review report that it report carbon stock changes in above-ground biomass and below-ground biomass under deforestation in KP-LULUCF CRF table 5(KP-I)A.2. Lithuania has stated in the NIR (p. 489) that emissions of above- and below-ground biomass of deforested areas were calculated as losses only, because it is assumed that all above- and below-ground biomass was removed entirely during the conversion process. The ERT commends Lithuania for its efforts to improve the completeness and accuracy of its reporting.

Activities under Article 3, paragraph 4, of the Kyoto Protocol

Forest management – CO_2

78. The ERT commends Lithuania for the significant improvement in data quality, when NFI permanent sample plots covered all the territory for the first time for the year 2012. The ERT also commends the Party for providing transparent and sufficient information regarding the methods for land representation and the estimation of carbon stock changes in all pools on forest management lands in the NIR, in line with decisions 15/CMP.1 and 16/CMP.1 and the IPCC good practice guidance on LULUCF.

2. Information on Kyoto Protocol units

Standard electronic format and reports from the national registry

79. Lithuania has reported information on its accounting of Kyoto Protocol units in the required SEF tables, as required by decisions 15/CMP.1 and 14/CMP.1. The ERT took note of the findings included in the standard independent assessment report (SIAR) on the SEF tables and the SEF comparison report.[7] The SIAR was forwarded to the ERT prior to the review, pursuant to decision 16/CP.10. The ERT reiterated the main findings contained in the SIAR.

80. Information on the accounting of Kyoto Protocol units has been prepared and reported in accordance with decision 15/CMP.1, annex, chapter I.E, and reported in accordance with decision 14/CMP.1 using the SEF tables. This information is consistent with that contained in the national registry and with the records of the international transaction log (ITL) and the clean development mechanism registry and meets the requirements referred to in decision 22/CMP.1, annex, paragraph 88(a–j). The transactions of Kyoto Protocol units initiated by the national registry are in accordance with the requirements of the annex to decision 5/CMP.1 and the annex to decision 13/CMP.1.

81. Information reported by the Party on records of any discrepancies and on any records of non-replacement was found to be consistent with information provided to the secretariat by the ITL.

Accounting of activities under Article 3, paragraph 3, of the Kyoto Protocol and any elected activities under Article 3, paragraph 4, of the Kyoto Protocol

82. Lithuania has reported information on its accounting of KP-LULUCF in the accounting table, as included in the annex to decision 6/CMP.3. Information on the accounting of KP-LULUCF has been prepared and reported in accordance with decisions 16/CMP.1 and 6/CMP.3.

83. Table 7 shows the accounting quantities for KP-LULUCF as reported by the Party and the final values after the review.

[7] The SEF comparison report is prepared by the international transaction log (ITL) administrator and provides information on the outcome of the comparison of data contained in the Party's SEF tables with corresponding records contained in the ITL.

Table 7
Accounting quantities for activities under Article 3, paragraph 3, and, if any, activities under Article 3, paragraph 4, of the Kyoto Protocol, in t CO_2 eq

	2014 annual submission[a]		
	As reported	*Revised estimates*	*Final accounting quantity*[b]
Afforestation and reforestation			
Non-harvested land	–760 320		–760 320
Harvested land	NA, NO		NA, NO
Deforestation	177 669		177 669
Forest management	–5 133 333		–5 133 333
Article 3.3 offset[c]	0		0
Forest management cap[d]	–5 133 333		–5 133 333
Cropland management	NA		NA
Grazing land management	NA		NA
Revegetation	NA		NA

Abbreviations: CRF = common reporting format, KP-LULUCF = land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, NA=not applicable, NO = not occurring.

[a] The values included under the 2014 annual submission are the cumulative accounting values for 2008, 2009, 2010, 2011 and 2012, as reported in the accounting table of the KP-LULUCF CRF tables for the inventory year 2012.

[b] The "final accounting quantity" is the quantity of Kyoto Protocol units that the Party shall issue or cancel under each activity under Article 3, paragraph 3, and paragraph 4, if relevant, based on the final accounting quantity in the 2014 annual submission.

[c] "Article 3.3 offset": for the first commitment period, a Party included in Annex I to the Convention that incurs a net source of emissions under the provisions of Article 3, paragraph 3, of the Kyoto Protocol may account for anthropogenic greenhouse gas emissions by sources and removals by sinks in areas under forest management under Article 3, paragraph 4, up to a level that is equal to the net source of emissions under the provisions of Article 3, paragraph 3, but not greater than 9.0 megatonnes of carbon times five, if the total anthropogenic greenhouse gas emissions by sources and removals by sinks in the managed forest since 1990 is equal to, or larger than, the net source of emissions incurred under Article 3, paragraph 3.

[d] In accordance with decision 16/CMP.1, annex, paragraph 11, for the first commitment period only, additions to and subtractions from the assigned amount of a Party resulting from forest management under Article 3, paragraph 4, of the Kyoto Protocol after the application of decision 16/CMP.1, annex, paragraph 10, and resulting from forest management project activities undertaken under Article 6, shall not exceed the value inscribed in the appendix of the annex to decision 16/CMP.1, times five.

84. Based on the information provided in table 7 for the activity afforestation and reforestation, Lithuania shall: for non-harvested land, issue 760,320 removal units (RMUs) in its national registry and for harvested land, neither issue nor cancel any units in its national registry.

85. Based on the information provided in table 7 for the activity deforestation, Lithuania shall cancel 177,669 assigned amount units, emission reduction units, certified emission reduction units and/or RMUs in its national registry.

86. Based on the information provided in table 7 for the activity forest management, Lithuania shall issue 5,133,333 RMUs in its national registry.

Calculation of the commitment period reserve

87. Lithuania has reported its commitment period reserve in its 2014 annual submission. Lithuania reported its commitment period reserve to be 108,111,427 t CO_2 eq based on the national emissions in its most recently reviewed inventory (21,622.29 Gg CO_2 eq). The ERT notes that based on the submission of revised emission estimates by Lithuania during the review of the 2014 annual submission, the commitment period reserve changed, and the

new commitment period reserve is reported as 108,113,775 t CO_2 eq. The ERT agrees with this figure.

3. Changes to the national system

88. The Party reported that there are no changes in its national system since the previous annual submission (NIR, p. 509). The ERT concluded that the Party's national system continues to be in accordance with the requirements of national systems outlined in decision 19/CMP.1.

4. Changes to the national registry

89. Lithuania reported that there are changes in its national registry since the previous annual submission. In the NIR (chapter 14), the Party reported the change of the registry administrator, which occurred in 2013. Additionally, Lithuania described a change in the diagram of the database structure. The changes introduced in releases 5 and 6 (January and June 2013) of the national registry were limited and only affected EU ETS functionality. The Party explained that no changes were required to the database, the application backup plan or the disaster recovery plan. The ERT concluded that, taking into account the confirmed changes in the national registry, Lithuania's national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP).

5. Minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol

90. Consistent with paragraph 23 of the annex to decision 15/CMP.1, Lithuania provided information relating to how it is striving, under Article 3, paragraph 14, of the Kyoto Protocol, to implement its commitments in such a way as to minimize adverse social, environmental and economic impacts on developing country Parties, particularly those identified in Article 4, paragraphs 8 and 9, of the Convention.

91. Lithuania reports that it continues to finance various projects that minimize the adverse social, environmental and economic impacts on developing countries. In 2013, Lithuania has provided information on its fast-start finance funding, which contributed to the overall objective of the EU. Lithuania reports that it has pledged to contribute to the Eastern European Energy Efficiency and Environment Fund, which is administered by European Bank for Reconstruction and Development. Furthermore, Lithuania reports that it has made an additional voluntary contribution to the fund. The total climate finance committed by Lithuania to developing countries in 2013 has increased compared with 2012 levels.

92. In its NIR (chapter 15), Lithuania did not specifically refer to changes in its reporting of the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol since the previous annual submission. However, the ERT noted the changes in the reporting, in particular in relation to updated information on fast-start finance provided in 2013 and planned for 2014. The ERT concluded that, taking into account the changes in the reporting, the information provided is complete and transparent. The ERT recommends that the Party report any change(s) in its information provided under Article 3, paragraph 14, in accordance with decision 15/CMP.1, annex, chapter I. H and/or further relevant decisions of the CMP.

III. Conclusions and recommendations

A. Conclusions

93. Table 8 summarizes the ERT's conclusions on the 2014 annual submission of Lithuania, in accordance with the Article 8 review guidelines.

Table 8
Expert review team's conclusions on the 2014 annual submission of Lithuania

Issue	*Expert review team assessment*	*Paragraph cross-references for identified problems*
The ERT concludes that the inventory submission of Lithuania is complete with regard to categories, gases, years and geographical boundaries and contains both an NIR and CRF tables for 1990–2012		
Annex A sources[a]	Complete for 2001–2012, not complete for 1990–2000	See table 3
LULUCF[a]	Not complete	See paragraph 61
KP-LULUCF	Complete	
The ERT concludes that the inventory submission of Lithuania has been prepared and reported in accordance with the UNFCCC reporting guidelines	Yes	
The Party's inventory is in accordance with the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF	Generally	See table 4 and paragraphs 42, 61, 64 and 75
The submission of information required under Article 7, paragraph 1, of the Kyoto Protocol has been prepared and reported in accordance with decision 15/CMP.1	Yes	
The Party has reported information on its accounting of Kyoto Protocol units in accordance with decision 15/CMP.1, annex, chapter I.E, and used the required reporting format tables as specified by decision 14/CMP.1	Yes	
The national system continues to perform its required functions as set out in the annex to decision 19/CMP.1	Yes	
The national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1 and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant CMP decisions	Yes	
Did the Party provide information in the NIR on changes in its reporting of the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol?	No	See paragraph 92

Abbreviations: Annex A sources = source categories included in Annex A to the Kyoto Protocol, CMP = Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol, CRF = common reporting format, ERT = expert review team, IPCC = Intergovernmental Panel on Climate Change, IPCC good practice guidance = IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, IPCC good practice guidance for LULUCF = IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry*, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LULUCF = land use, land-use change and forestry, NIR = national inventory report, Revised 1996 IPCC Guidelines = *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*, UNFCCC reporting guidelines = "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories".

[a] The assessment of completeness by the ERT considers only the completeness of reporting of mandatory categories (i.e. categories for which methods and default emission factors are provided in the Revised 1996 IPCC Guidelines, the IPCC good practice guidance or the IPCC good practice guidance for LULUCF).

B. Recommendations

94. The ERT identified the issues for improvement listed in table 9. All recommendations are for the next annual submission, unless otherwise specified.

Table 9
Recommendations identified by the expert review team

Sector	*Category cross-cutting issue*	*Recommendation*	*Reiteration of previous recommendation?*	*Paragraph cross-references*
Cross-cutting	Completeness	Estimate and report emissions from all mandatory categories	No	Table 3
	QA/QC	Reinforce the implementation of appropriate tier 1 QC procedures	No	Table 3
		Explain how the "basic internal review" is used to make improvements to the inventory	Yes	Table 3
		Explain that the institutes carrying out the review are not directly involved in inventory preparation in order to justify the basic internal review as a QA activity rather than a QC activity	No	Table 3
	Inventory preparation	Correct the tier 2 key category analysis	No	Table 4
Energy	General	Improve the QC procedures in order to ensure consistency between the values reported in the NIR and the CRF tables	No	20
	International bunker fuels	Correct the information in the NIR regarding use of jet kerosene for domestic/international aviation	No	23
		Include in the NIR the information regarding country-specific CO_2 EF for gas/diesel oil	No	24
	Feedstocks and non-energy use of fuels	Correct the information regarding the refinery feedstocks in CRF table 1.A(d) and include relevant explanations in the NIR	No	25
	Stationary combustion:	Include a more detailed explanation on the selection of the plant-specific EFs for public	No	26, 27

Sector	Category cross-cutting issue	Recommendation	Reiteration of previous recommendation[1]	Paragraph cross-references
	liquid and gaseous fuels – CO_2	electricity and heat production and petroleum refining in the NIR		
Industrial processes and solvent and other product use	Ammonia production – CO_2	Correct the errors in the NIR regarding the data and method used for the estimation of emissions from ammonia production.	No	32
		Correct the notation key in the CRF table summary 3 on the CO_2 EF for chemical industry	No	33
		Provide more accurate and transparent information on the EF in the NIR	Yes	33
		Improve QC procedures in order to rectify errors in the NIR and the CRF tables	No	33
	Lime production – CO_2	Explain the methodology and data sources used to provide revised estimates	No	40
	Iron and steel production – CO_2	Carry out an analysis of the potential overestimation and provide a discussion on the subject in the NIR	No	42
Agriculture	General	Improve the completeness and QC of reporting in the CRF tables	Yes	46
		Provide in the NIR an explanation for the difference in animal population numbers between the inventory and the FAO data	Yes	46
		Continue to investigate the differences between the national data on synthetic fertilizer consumption provided by UAB Agrochema and the data provided by the International Fertilizer Industry Association	Yes	46
		Include in the NIR the information regarding how the overall AD uncertainties have been derived for manure management category	No	47
	Enteric fermentation – CH_4	Provide additional information in the NIR on the approach used to estimate DMI for sheep	No	48
		Include in the NIR the specific animal and feed characteristics and DMIs per subcategory	No	49
		Provide the Ym values for sheep and swine in both the NIR and the CRF tables	No	51
	Manure management – CH_4 and N_2O	Explain in the NIR that the MCF of zero was based on information provided by the biogas plant that all CH_4 was collected and combusted	No	52

Sector	*Category/ cross-cutting issue*	*Recommendation*	*Reiteration of previous recommendation?*	*Paragraph cross-references*
		Report Bo for sheep in the NIR and the CRF table 4.B(a)	No	53
		Explore the possibility of applying the tier 2 method for the manure management N_2O emissions from sheep	No	54
LULUCF	Forest land remaining forest land – CO_2	Further explore different opportunities regarding how the data presented in NFI could be allocated during the five-year inventory cycle	No	59
	Land converted to wetlands – CO_2	Report the carbon stock changes in living biomass in cropland and grassland converted to wetlands	No	61
	Non-CO_2 emissions from drainage of soils and wetlands – CH_4 and N_2O	Use the notation key "NO" instead of "NE" for the drainage of soils and wetlands in forest land – mineral soil	No	62
	Biomass burning – CO_2, CH_4 and N_2O	Use the country-specific data and methodology that takes into account combustion efficiency values or use default values for combustion efficiency	No	64
Waste	Solid waste disposal on land – CH_4	Include the amount of solid waste disposed in each category of SWDS in the NIR	No	69
		Include the amount of sewage sludge disposed in each category of SWDS in the NIR	No	70
	Wastewater handling –CH_4	Include in the NIR the information on the contribution of BOD load from industrial wastewater	No	71
		Report the percentages of handling systems for wastewater in CRF table 6.B or provide a justification for the use of the notation key "NE"	No	72
Article 3, paragraph 14		Report any change(s) in the information provided under Article 3, paragraph 14	No	92

Abbreviations: AD= activity data, Bo = methane producing capacity, BOD = biochemical oxygen demand, CRF = common reporting format, DMI = dry-matter intake, EF = emission factor, FAO = Food and Agriculture Organization of the United Nations, LULUCF = land use, land-use change and forestry, MCF = methane conversion factor, NFI = national forest inventory, NIR = national inventory report, NE = not estimated, NO = not occurring, QA/QC = quality assurance/quality control, QC = quality control, SWDS = solid waste disposal site, Ym = methane conversion rate.

IV. Questions of implementation

95. No questions of implementation were identified by the ERT during the review.

Annex I

Information to be included in the compilation and accounting database

Table 10
Information to be included in the compilation and accounting database in t CO_2 eq for 2012, including the commitment period reserve

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Commitment period reserve	108 111 427	108 113 775		108 113 775
Annex A emissions for 2012				
CO_2	14 182 004	14 182 473		14 182 473
CH_4	3 051 316			3 051 316
N_2O	4 144 118			4 144 118
HFCs	240 663			240 663
PFCs	NA, NO			NA, NO
SF_6	4 185			4 185
Total Annex A sources[c]	**21 622 285**	**21 622 755**		**21 622 755**
Activities under Article 3, paragraph 3, for 2012				
3.3 Afforestation and reforestation on non-harvested land for 2012	–195 858			–195 858
3.3 Afforestation and reforestation on harvested land for 2012	NA, NO			NA, NO
3.3 Deforestation for 2012	65 993			65 993
Activities under Article 3, paragraph 4, for 2012[d]				
3.4 Forest management for 2012	–9 211 605			–9 211 605
3.4 Cropland management for 2012				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2012				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2012				
3.4 Revegetation for the base year				

Abbreviations: Annex A sources = source categories included in Annex A to the Kyoto Protocol, NA = not applicable, NO = not occurring.

[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

[b] "Final" includes revised estimates, if any, and/or adjustments, if any.

[c] The values for "Total Annex A sources" in the columns "As reported", "Revised estimates" and "Final" may not equal the sum of the values for the gases in those columns owing to rounding.

[d] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Table 11
Information to be included in the compilation and accounting database in t CO_2 eq for 2011

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2011				
CO_2	14 029 179	14 029 539		14 029 539
CH_4	3 071 444			3 071 444
N_2O	4 351 726			4 351 726
HFCs	219 510			219 510
PFCs	NA, NO			NA, NO
SF_6	8 117			8 117
Total Annex A sources[c]	**21 679 976**	**21 680 336**		**21 680 336**
Activities under Article 3, paragraph 3, for 2011				
3.3 Afforestation and reforestation on non-harvested land for 2011	–166 794			–166 794
3.3 Afforestation and reforestation on harvested land for 2011	NA, NO			NA, NO
3.3 Deforestation for 2011	18 441			18 441
Activities under Article 3, paragraph 4, for 2011[d]				
3.4 Forest management for 2011	–10 864 629			–10 864 629
3.4 Cropland management for 2011				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2011				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2011				
3.4 Revegetation for the base year				

Abbreviations: Annex A sources = source categories included in Annex A to the Kyoto Protocol, NA = not applicable, NO = not occurring.

[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

[b] "Final" includes revised estimates, if any, and/or adjustments, if any.

[c] The values for "Total Annex A sources" in the columns "As reported", "Revised estimates" and "Final" may not equal the sum of the values for the gases in those columns owing to rounding.

[d] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Table 12
Information to be included in the compilation and accounting database in t CO_2 eq for 2010

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2010				
CO_2	13 691 856	13 692 165		13 692 165
CH_4	3 207 961			3 207 961
N_2O	4 020 431			4 020 431
HFCs	192 483			192 483
PFCs	NA, NO			NA, NO
SF_6	5 853			5 853
Total Annex A sources[c]	**21 118 584**	**21 118 894**		**21 118 894**
Activities under Article 3, paragraph 3, for 2010				
3 3 Afforestation and reforestation on non-harvested land for 2010	–146 387			–146 387
3 3 Afforestation and reforestation on harvested land for 2010	NA, NO			NA, NO
3 3 Deforestation for 2010	45 977			45 977
Activities under Article 3, paragraph 4, for 2010[d]				
3 4 Forest management for 2010	–10 611 149			–10 611 149
3 4 Cropland management for 2010				
3 4 Cropland management for the base year				
3 4 Grazing land management for 2010				
3 4 Grazing land management for the base year				
3 4 Revegetation for 2010				
3 4 Revegetation for the base year				

Abbreviations: Annex A sources = source categories included in Annex A to the Kyoto Protocol, NA = not applicable, NO = not occurring.

[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

[b] "Final" includes revised estimates, if any, and/or adjustments, if any.

[c] The values for "Total Annex A sources" in the columns "As reported", "Revised estimates" and "Final" may not equal the sum of the values for the gases in those columns owing to rounding.

[d] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Table 13
Information to be included in the compilation and accounting database in t CO_2 eq for 2009

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2009				
CO_2	12 893 281	12 893 583		12 893 583
CH_4	3 259 247			3 259 247
N_2O	4 108 578			4 108 578
HFCs	167 756			167 756
PFCs	NA, NO			NA, NO
SF_6	2 768			2 768
Total Annex A sources[c]	**20 431 631**	**20 431 933**		**20 431 933**
Activities under Article 3, paragraph 3, for 2009				
3 3 Afforestation and reforestation on non-harvested land for 2009	–135 700			–135 700
3 3 Afforestation and reforestation on harvested land for 2009	NA, NO			NA, NO
3 3 Deforestation for 2009	17 889			17 889
Activities under Article 3, paragraph 4, for 2009[d]				
3 4 Forest management for 2009	–11 657 334			–11 657 334
3 4 Cropland management for 2009				
3 4 Cropland management for the base year				
3 4 Grazing land management for 2009				
3 4 Grazing land management for the base year				
3 4 Revegetation for 2009				
3 4 Revegetation for the base year				

Abbreviations: Annex A sources = source categories included in Annex A to the Kyoto Protocol, NA = not applicable, NO = not occurring.

[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

[b] "Final" includes revised estimates, if any, and/or adjustments, if any.

[c] The values for "Total Annex A sources" in the columns "As reported", "Revised estimates" and "Final" may not equal the sum of the values for the gases in those columns owing to rounding.

[d] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Table 14
Information to be included in the compilation and accounting database in t CO_2 eq for 2008

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2008				
CO_2	15 079 123	15 079 269		15 079 269
CH_4	3 359 559			3 359 559
N_2O	6 337 554			6 337 554
HFCs	152 809			152 809
PFCs	NA, NO			NA, NO
SF_6	3 212			3 212
Total Annex A sources[c]	**24 932 257**	**24 932 403**		**24 932 403**
Activities under Article 3, paragraph 3, for 2008				
3 3 Afforestation and reforestation on non-harvested land for 2008	–115 581			–115 581
3 3 Afforestation and reforestation on harvested land for 2008	NA, NO			NA, NO
3 3 Deforestation for 2008	29 369			29 369
Activities under Article 3, paragraph 4, for 2008[d]				
3 4 Forest management for 2008	–9 032 759			–9 032 759
3 4 Cropland management for 2008				
3 4 Cropland management for the base year				
3 4 Grazing land management for 2008				
3 4 Grazing land management for the base year				
3 4 Revegetation for 2008				
3 4 Revegetation for the base year				

Abbreviations: Annex A sources = source categories included in Annex A to the Kyoto Protocol, NA = not applicable, NO = not occurring.

[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

[b] "Final" includes revised estimates, if any, and/or adjustments, if any.

[c] The values for "Total Annex A sources" in the columns "As reported", "Revised estimates" and "Final" may not equal the sum of the values for the gases in those columns owing to rounding.

[d] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Annex II

Documents and information used during the review

A. Reference documents

Intergovernmental Panel on Climate Change. *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. Available at <http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html>.

Intergovernmental Panel on Climate Change. *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*. Available at <http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.htm>.

Intergovernmental Panel on Climate Change. *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*. Available at <http://www.ipcc-nggip.iges.or.jp/public/gp/english/>.

Intergovernmental Panel on Climate Change. *Good Practice Guidance for Land Use, Land-Use Change and Forestry*. Available at <http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf.htm>.

"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories". FCCC/SBSTA/2006/9. Available at <http://unfccc.int/resource/docs/2006/sbsta/eng/09.pdf>.

"Guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention". FCCC/CP/2002/8. Available at <http://unfccc.int/resource/docs/cop8/08.pdf>.

"Guidelines for national systems for the estimation of anthropogenic greenhouse gas emissions by sources and removals by sinks under Article 5, paragraph 1, of the Kyoto Protocol". Decision 19/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=14>.

"Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol". Decision 15/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=54>.

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Synthesis and assessment report on the greenhouse gas inventories submitted in 2014. Available at <http://unfccc.int/resource/webdocs/sai/2014.pdf>.

FCCC/ARR/2013/LTU. Report of the individual review of the annual submission of Lithuania submitted in 2013. Available at <http://unfccc.int/resource/docs/2014/arr/ltu.pdf>.

Standard independent assessment report template, parts 1 and 2. Available at <http://unfccc.int/kyoto_protocol/registry_systems/independent_assessment_reports/items/4061.php>.

B. Additional information provided by the Party

Responses to questions during the review were received from Ms. Jolanta Merkeliene (Ministry of the Environment), including additional material on the methodology and assumptions used.

Annex III

Acronyms and abbreviations

AD	activity data
BAT	"best available techniques"
Bo	methane producing capacity
BOD	biochemical oxygen demand
C	carbon
$CaCO_3$	calcium carbonate
CaO	calcium oxide
CH_4	methane
CMP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CRF	common reporting format
DMI	dry matter intake
DOC	degradable organic carbon
DOC_f	fraction of degradable organic carbon dissimilated
EAF	electric arc furnace
EF	emission factor
ERT	expert review team
EU	European Union
EU ETS	European Union Emissions Trading System
FOD	first-order decay
GE	gross energy
GEI	gross energy intake
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the sum of CO_2, CH_4, N_2O, HFCs, PFCs and SF_6 without GHG emissions and removals from LULUCF
ha	hectare
HFCs	hydrofluorocarbons
IE	included elsewhere
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
ITL	international transaction log
k	CH_4 generation rate constant
kg	kilogram (1 kg = 1,000 grams)
KP-LULUCF	land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol
LULUCF	land use, land-use change and forestry
m^3	cubic metre
MCF	methane conversion factor
N	nitrogen
N_2O	nitrous oxide
NA	not applicable
NE	not estimated
NFI	National forestry inventory
NIR	national inventory report
NO	not occurring
PFCs	perfluorocarbons
PJ	petajoule (1 PJ = 10^{15} joule)

QA/QC	quality assurance/quality control
QC	quality control
RMU	removal unit
SEF	standard electronic format
SF_6	sulphur hexafluoride
SIAR	standard independent assessment report
SWDS	solid waste disposal site
TJ	terajoule (1 TJ = 10^{12} joule)
UNFCCC	United Nations Framework Convention on Climate Change
Ym	methane conversion rate